

Remarks

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Minor editorial changes have been made in the specification, which are essentially self-explanatory.

In response to the Examiner's argument (at the middle of page 3 of the Office Action) that the claims contain no limitation to performing the two-step heat treatment for any time limitation, claim 1 has been amended to insert a time limitation, based on the disclosure in the second full paragraph on page 7 of the specification.

The patentability of the presently claimed invention over the disclosure of the reference relied upon by the Examiner in rejecting the claims, will be apparent upon consideration of the following remarks.

Thus, the rejection of claims 1 and 2 under 35 U.S.C. § 103(a) as being unpatentable over Jones (US 4,732,622) is respectfully traversed.

As indicated above, claim 1 has been amended to insert a limitation concerning the time for the heat treatment.

The most important feature of the present invention resides in that a two-step heat treatment consisting of a first step heat treatment at lower temperature and a second step heat treatment at higher temperature is employed for the intermediate heat treatment during the cold rolling.

Namely, in the past, when a recrystallization structure is generated in the intermediate heat treatment, an objective recrystallization structure can not be obtained by the final heat treatment. Thus, the following two conflicting conditions are required in the intermediate heat treatment:

(1) Softening to a lower hardness (400 Hv or lower) so as to efficiently perform cold rolling in the next step.

(2) Preventing the generation of recrystallization during the intermediate heat treatment.

To satisfy the condition (1), it is considered that the intermediate heat treatment is performed at a relatively higher temperature (1100°C or higher). However, when the intermediate heat treatment is conducted at such a higher temperature, recrystallization is generated and the condition (2) can not be achieved. On the contrary, to satisfy the condition (2), it is considered that the intermediate heat treatment is performed at a relatively lower temperature (1100°C or lower). However, at such a lower temperature, sufficient softening does not occur and the condition (1) can not be achieved.

According to the present invention, the above-described conflicting conditions (1) and (2) can be satisfied by performing the intermediate heat treatment during the cold rolling by a two-step heat treatment of a first step heat treatment of 1100°C or lower and a second step heat treatment of 1100°C to 1250°C and higher than the first step temperature.

As a result, a recrystallization structure is not generated during the intermediate heat treatment and sufficient softening of a tube material can be performed, so that the subsequent cold rolling can be performed easily and effectively and thus the reliability of cold rolling can be improved. Therefore, the number of occurrences of cracks can be suppressed and the yield of the products is improved (see the last full paragraph on page 12 of the specification).

Jones discloses a method of producing products composed of mechanically-alloyed, dispersion-strengthened iron-base material, wherein the recrystallization structure is generated by heat treatment, after the working strain is stored in the material by cold rolling.

However, Jones does not disclose or suggest the intermediate heat treatment by the two-step heat treatment according to the present invention for satisfying the above-described conflicting conditions (1) and (2).

For these reasons, Applicants respectfully submit that the presently claimed invention is clearly patentable over the Jones reference.

The provisional rejection of claims 1 and 2 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-4 of Serial No. 10/502,257 is respectfully traversed.

This copending application relates to an oxide dispersion strengthened martensitic steel excellent in high-temperature strength in which oxide particles are finely and homogeneously dispersed at a high density (see para. [0007] of the Publication 2005/0084405 A1).

The oxide dispersion strengthened martensitic steel of the copending application is basically different in technical idea from the oxide dispersion strengthened ferritic steel having a recrystallization structure of the present invention. In the oxide dispersion strengthened martensitic steel, since it is not necessary to generate a recrystallization structure by the final heat treatment, it is sufficient to soften the material by an intermediate heat treatment, and therefore an intermediate heat treatment consisting of the two-step heat treatment of the present invention is not required.

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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By:

A handwritten signature in black ink, appearing to read "Michael R. Davis", written over a horizontal line.

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